

Amendments to the Claims

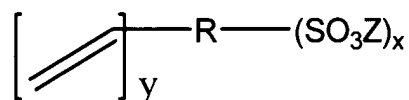
Please amend Claims 16, 21 and 36. Please cancel Claims 20, 30-35. Please add new Claims 40-42. The Claim Listing below will replace all prior versions of the Claims in the application.

Claim Listing

1-15 (Cancelled)

16. (Currently amended) A proton-conducting electrolyte membrane obtained by a process comprising the steps of:
- a) swelling a polymer film with a liquid comprising a vinyl-containing sulphonic acid and vinyl-containing phosphonic acid, wherein the polymer film comprises after swelling at least 10% by weight vinyl-containing sulphonic acid and vinyl-containing phosphonic acid; and
 - b) polymerizing the vinyl-containing sulphonic acid and vinyl-containing phosphonic acid present in the liquid introduced in step a), thereby forming an interpenetrating network,
- wherein the membrane obtained in step (b) comprises at least 10% by weight of polyvinyl-containing phosphonic acid,
and wherein the conductivity of the membrane at temperatures of 160°C is at least 0.001 S/cm.
17. (Cancelled)
18. (Previously Presented) The membrane of Claim 16, characterized in that the polymers used in step a) are polymers that are stable at high temperatures and contain at least one nitrogen, oxygen, or sulphur atom in one or more repeat units.

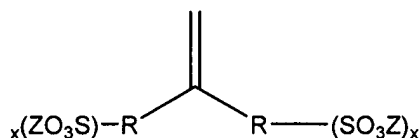
19. (Previously Presented) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, a C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, or NZ₂,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

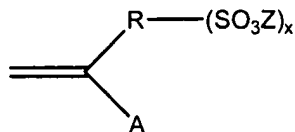
or the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or the formula

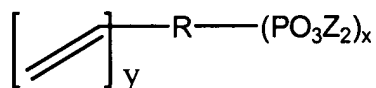


wherein

- A represents a group of the formulae COOR^2 , CN , CONR^2_2 , OR^2 and/or R^2 , wherein R^2 represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, $-\text{OH}$, COOZ , $-\text{CN}$, NZ_2 ,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, $-\text{OH}$, COOZ , $-\text{CN}$, NZ_2 ,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, $-\text{OH}$, $-\text{CN}$, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

20. (Cancelled)

21. (Currently Amended) The membrane of Claim [[20]] 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which

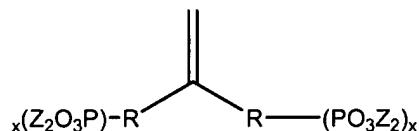
the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,

Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or of the formula



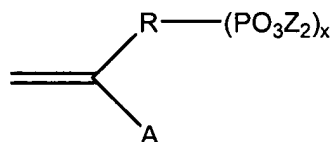
wherein

R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,

Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

or of the formula



wherein

A represents a group of the formulae COOR², CN, CONR²₂, OR² or R², wherein R² represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl

group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,

- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.

22. (Cancelled)

23. (Cancelled)

24. (Previously Presented) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains at least one substance capable of forming radicals.

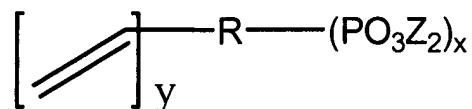
25. (Previously Presented) The membrane of Claim 16, characterized in that the polymerization in step b) is carried out by irradiation with IR or NIR light, UV-light, β , γ and/or electron rays.

26. (Previously Presented) The method of Claim 16, characterized in that the membrane has inherent conductivity of at least 0.001 S/cm.

27. (Cancelled)

28. (Previously Presented) The membrane of Claim 16, characterized in that the membrane comprises a layer containing a catalytically active component.

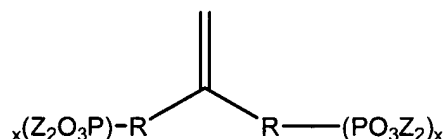
29. (Previously Presented) The membrane of Claim 16, characterized in that the liquid comprising a vinyl-containing sulphonic acid contains phosphonic acid and compounds of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
- y represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10

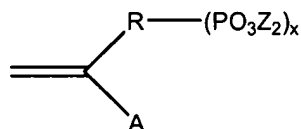
or of the formula



wherein

- R represents a bond, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, COOZ, -CN, NZ₂,
- Z represents, independently of one another, hydrogen, C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, -OH, -CN, and

x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10
or of the formula



wherein

- A represents a group of the formulae COOR^2 , CN , CONR^2_2 , OR^2 or R^2 , wherein R^2 represents hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, $-\text{OH}$, COOZ , $-\text{CN}$, NZ_2 ,
- R represents a bond, a divalent C1-C15 alkylene group, divalent C1-C15 alkyleneoxy group, in which the aforementioned radicals are optionally substituted by halogen, $-\text{OH}$, COOZ , $-\text{CN}$, NZ_2 ,
- Z represents, independently of one another, hydrogen, a C1-C15 alkyl group, C1-C15 alkoxy group, ethyleneoxy group or C5-C20 aryl or heteroaryl group, in which the aforementioned radicals are optionally substituted by halogen, $-\text{OH}$, $-\text{CN}$, and
- x represents an integer 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10; and
the ratio by weight of vinyl-containing phosphonic acid to vinyl-containing sulphonic acid lies in the range of 1:100 to 99:1.

30-35. (Cancelled)

36. (Currently Amended) [[A]] The proton-conducting electrolyte membrane obtained by a process comprising the steps of Claim 16, wherein [[:]]
a) ~~swelling a polymer film with a liquid comprising a vinyl-containing sulphonic acid, wherein the liquid swollen polymer film comprises after swelling at least 30% by weight vinyl-containing sulphonic acid; and~~

b) ~~polymerizing the vinyl-containing sulphonic acid present in the liquid introduced in step a).~~

37-39. (Cancelled)

40. (New) The proton-conducting electrolyte membrane of Claim 16, wherein the proportion of polyvinyl-containing phosphonic acid is from 10% to 97% by weight.
41. (New) The proton-conducting electrolyte membrane of Claim 16, wherein the membrane obtained in step (b) comprises between 1% and 90% by weight of the polymer.
42. (New) A proton-conducting electrolyte membrane obtained by a process comprising the steps of:
- a) swelling a polymer film with a liquid comprising a vinyl-containing sulphonic acid and vinyl-containing phosphonic acid, wherein the polymer film comprises after swelling at least 10% by weight vinyl-containing sulphonic acid and vinyl-containing phosphonic acid; and
 - b) polymerizing the vinyl-containing sulphonic acid and vinyl-containing phosphonic acid present in the liquid introduced in step a), thereby forming an interpenetrating network,
- wherein the membrane obtained in step (b) comprises from 20% to 95% by weight of polyvinyl-containing phosphonic acid,
and wherein the conductivity of the membrane at temperatures of 160°C is at least 0.001 S/cm.